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UNITED STATES DEPARTMENT OF AGRICULTURE
U.S., SOIL CONSERVATION SERVICE
WASHINGTON, D. C.
H. H. BENNETT, CHIEF

ADVANCE REPORT

on the

SEDIMENTATION SURVEY OF BAKER RESERVOIR

BAKER, MONTANA

May 24 to June 6, 1937

by

Victor H. Jones

Library
Soil Conservation Service
U. S. Department of Agriculture
Washington, D. C.

In Cooperation With

Montana Agricultural Experiment Station
Bozeman, Montana
F. B. Linfield, Director

Sedimentation Studies
Division of Research
SCS-SS-21
July, 1938

2941

ADVANCE REPORT ON THE

SEDIMENTATION SURVEY OF BAKER RESERVOIR

BAKER, MONTANA

SEP 21 1938

GENERAL INFORMATION

Location (fig. 1):

State: Montana.

County: Fallon. Section 13, T. 7 N., R. 59 E.

Distance and direction from nearest city: The lake extends in a southeasterly direction from the dam, which is in the southern part of Baker.

Drainage and backwater: The dam is on Sandstone Creek near its head. Below Baker the creek flows generally northwestward about 25 miles to join O'Fallon Creek, a southern tributary of the Yellowstone River.

Ownership: The Chicago, Milwaukee, St. Paul, and Pacific Railroad.

Purpose: Formerly a water supply for the railroad; now used only for recreation and ice supply.

Description of the dam: Baker Reservoir is impounded by an earth-fill dam extending somewhat west of north across the small valley of Sandstone Creek. The dam is 1,100 feet long, 40 feet wide at the top, and has a maximum height of 25 feet above the stream bed. The crest forms the roadbed for the graveled State Highway No. 7, which traverses Fallon County in a general north-south direction. Both upstream and downstream faces have slopes of $1\frac{1}{2}$:1, and the former is faced with loose rock riprap to within 3 feet of the crest.

A concrete spillway with a crest length of 40 feet and a height of 20 feet above the stream bed is located at the south end of the dam. The spillway crest is 2,934.14 feet above sea level, as determined by measurements from United States Geological Survey benchmark No. U-56 (elevation 2,937.136)

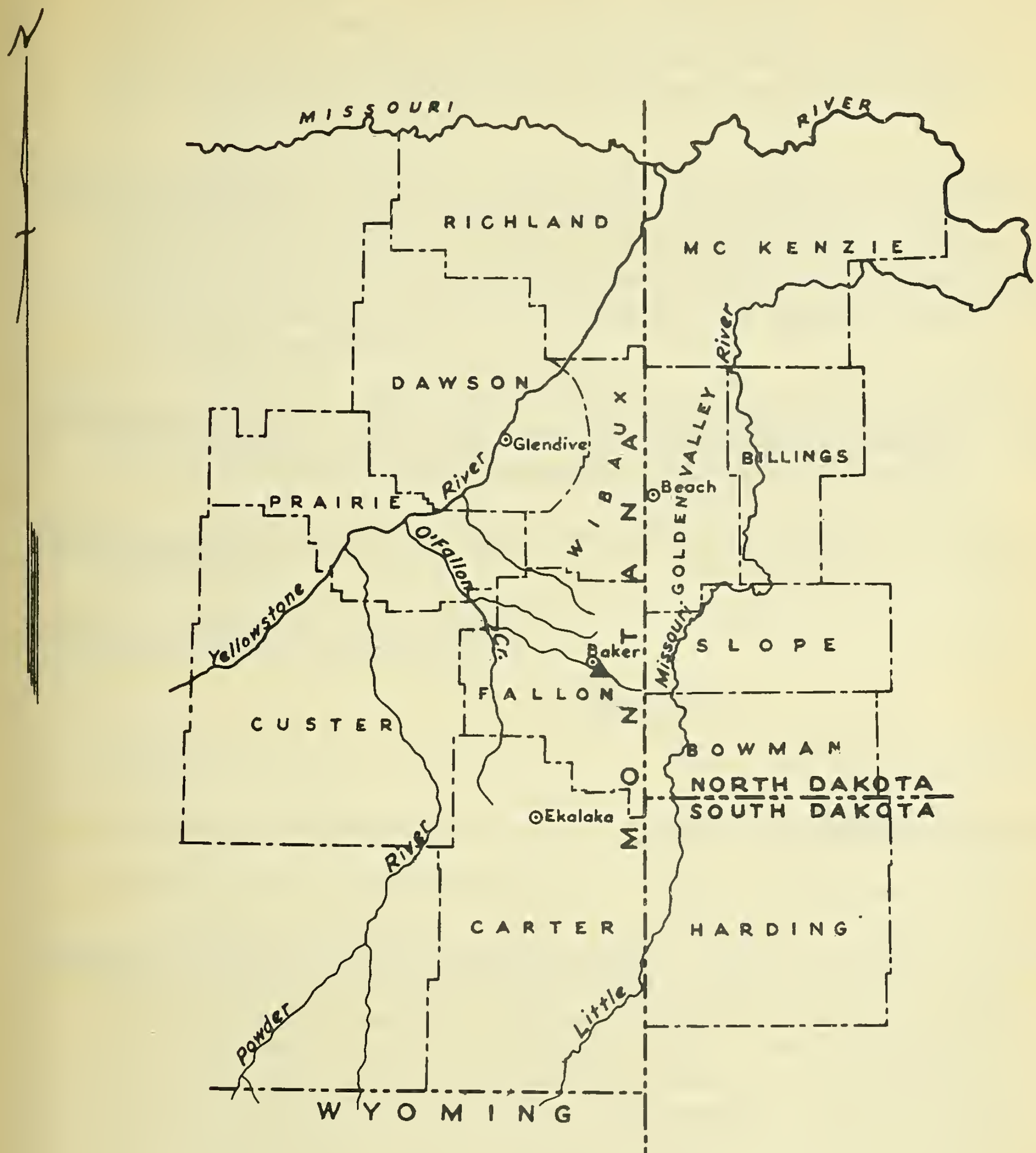


Figure 1

MAP SHOWING LOCATION
OF
BAKER RESERVOIR

Scale in Miles

25 0 25 50

LEGEND

▲ Baker Reservoir

located on a buttress of the spillway, and is 5 feet below the top of the dam. A shallow sodded channel about 150 feet long, 50 feet wide, and 2 feet deep carries overflow water from the lake past the dam and under the highway to the spillway. Minor amounts of scouring and filling occasionally occur in this channel (fig. 2).

Date of completion: Early in May 1908. The spillway was originally $22\frac{1}{2}$ feet high, but was lowered to 20 feet in 1914. The lake was first filled during the last week in May 1908 by a heavy rainfall which raised the water level to 2.5 feet above spillway crest. Although the dam was endangered at that time, no washout occurred.

Length of the lake: The extreme length of the lake is 6,600 feet, not including 1,100 feet of very narrow ponded channel. Deposition of silt has not appreciably reduced its length.

Area of the lake at crest stage: Original and at date of survey, 122 acres.

Storage capacity to crest level:

	Acre-feet	
Original......................	756	(246,342,600 gals.)
At date of survey............	502	(163,576,700 gals.)
Reduction by sedimentation...	254	(82,765,900 gals.)

General character of the reservoir basin: The crest-level contour, at an elevation of 2,934 feet, encloses a relatively long, narrow basin extending southeastward approximately 1.3 miles from the dam (fig. 4, following p. 15). The shore line is fairly smooth, being interrupted by only two relatively small bays on each side of the lake. The ponded section of Sandstone Creek channel is 1,100 feet long, 30 feet wide, and less than 4 feet deep. Most of this channel is usually dry because the prevailing lake level is 2 feet or more below crest. The maximum width of the lake, at range R5-R6, is 1,100 feet, and the average width is 700 feet.

The maximum original depth of the reservoir basin, as shown by measurements on range R1-R2 near the dam, was 15.7 feet. As the length of channel from the head of backwater to this range is 7,400 feet, the average gradient on the channel

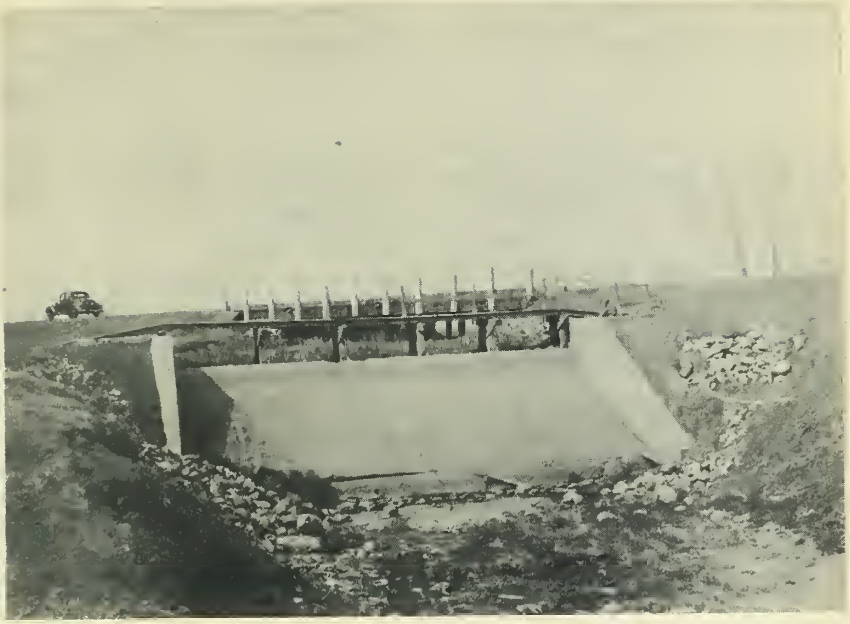


Figure 2.--Spillway of Baker Reservoir.

Figure 3.--Channel of Sandstone Creek, the main feeder stream, one-half mile above Baker Reservoir.

bottom is 13 feet per mile. This figure also closely represents the gradient on the original lake bottom because the channel follows a fairly direct course through the basin. The gradient on the surface of the silt deposit is only 5.3 feet per mile.

Smooth gentle slopes, descending from crest line to the original valley bottom with an average inclination of less than 5 percent, characterize the sides of the reservoir basin (fig. 5). The original valley bottom is not flat, but fairly irregular, because of alternate erosion and deposition by flood waters prior to inundation. The creek channel itself is irregular and discontinuous, and contains scoured depressions ranging from 1 to 3 feet in depth. It has had little influence upon sedimentation in the reservoir except to cause local concentrations of sediment in the scoured depressions.

Area of drainage basin: 5.2 square miles, as determined by planimeter measurement of a map of the watershed boundary made during the course of the survey.

General character of drainage basin:

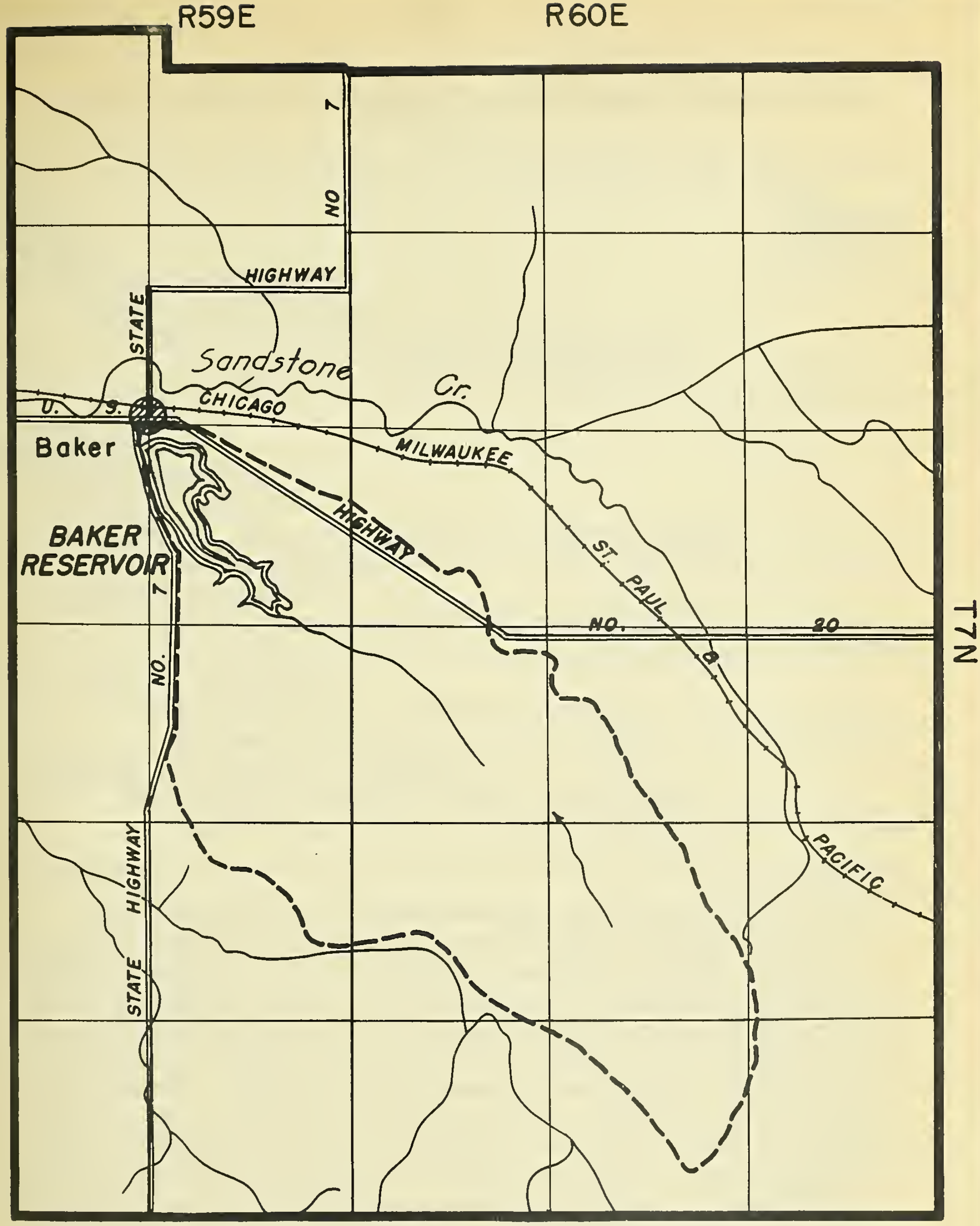
Geology: The drainage basin of Baker Reservoir (fig. 6), lies within the northern portion of the Great Plains province. It is near the center of a conspicuous folded structure known as the Baker anticline, upon which several oil and gas fields have been developed. About 5 gas wells are now in production in the area, but they have little effect upon sedimentation in the reservoir. During drilling of the wells, however, a small quantity of pulverized rock debris was dumped on the slopes nearby.

The rock formations in the immediate vicinity of Baker are shales, sands, sandstones, coals, and clinker beds of late Cretaceous and early Tertiary age. The nature and age relations of the local formations are shown in the following generalized section.

Figure 5.-Town of Baker, Mont., and Baker Reservoir.

(Follow p. 4)

Figure 6



BAKER RESERVOIR AND WATERSHED
BAKER, MONTANA
June 1937

LEGEND

Watershed Boundary	Highways
	Railroads

1 ½ 0 1 2

Scale in miles

N-2208

Revised 6-11-38

Generalized section of strata in the drainage basin of Baker Reservoir

	Thickness in feet
Tertiary:	
Eocene:	
Fort Union formation:	
Tongue River member--	
Sand, shale, marl, coal and clinker beds; occurs only on upland near watershed boundary..................................	200-275
Upper Cretaceous:	
Lance formation:	
Ludlow member--	
Shale, sandstone, lignite, clinker; around watershed boundary...........................	300-400
Hell Creek member--	
Shale and sandstone; around watershed boundary..................................	300-400
Fox Hills member--	
Sandstone, massive; around watershed boundary..................................	200-300
Bearpaw (or Pierre?) formation:	
Clay-shale, dark gray; most of drainage area......................................	3,000+

The topography of approximately 90 percent of the area has been developed on the Bearpaw shale on the crest of the Baker anticline. This formation consists chiefly of dark gray clay-shale which is very plastic and tenacious when wet. It contains thin beds of sand and many globular calcareous concretions ranging from less than 1 inch to more than 2 feet in diameter. Under the influence of weathering processes the concretions disintegrate into angular fragments which, with minor exceptions, are the source of the only coarse erosional material included in the reservoir deposits. The sandy members of the Lance formation occur only along the east and west edges of the catchment area. Extensive coal beds of Lance and Fort Union age in the surrounding region have ignited and burned with such intense heat that the overlying shales have been burned and even fused to bright red or buff-colored clinker. The baked and vitrified clinker is very resistant to erosion and forms knobs and ridges which stand at heights ranging from 100 to 200 feet above surrounding areas. One such knob occurs at the southwest watershed

boundary, but very little of the clinker gravel has been transported as far as the lake basin.

Topography and drainage: The drainage basin of Baker Reservoir is in a youthful stage of topographic development. It lies in the partially dissected upland of the High plains, in the extreme upper headwaters of the southern tributaries of the Yellowstone River. One clinker-capped knob on the south rim of the drainage basin, $1\frac{1}{2}$ miles south of the dam, stands nearly 200 feet above the level of the lake, but other points around the rim are less than 80 feet above lake level. The drainage area is roughly ovoid in outline and slopes inward toward the lake rather smoothly at an average inclination of about 60 feet per mile. (1.1 percent).

All surface drainage has intermittent flow which occurs only during and immediately following the infrequent rains. The stream channels are irregular and discontinuous. Even the main channel of Sandstone Creek above the lake is merely a series of small scoured basins with intervening sparsely grassed areas (fig. 3).

The angular straight-line watershed boundary south and east of the dam is determined by road fills which limit drainage near the lake.

Soils: The Pierre clay loam, a dark heavy soil of low productivity, covers approximately 90 percent of the drainage area, conforming essentially to the outcrop area of the Bearpaw shale. Pierre soil has a characteristic mulch about 2 inches in depth, which consists of clay granules that are usually covered by a definite crust. The organic layer is a poorly developed clay loam, non-calcareous and dark grayish brown in color. The underlying soil material is little more than the disintegrated parent shale. Heavy tough clays occur below a depth of 18 inches, and the unaltered shale lies at an average depth of 2 feet. A zone of salt accumulation usually occurs at about 15 inches below the surface.[1]

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1 Nunns, F. K. Soil survey of Fallon County. Unpublished data furnished by Gibson Zeidler, extension agent, Fallon and Carter Counties, Baker, Mont., in a personal communication to Leland H. Barnes, Soil Conservation Service, June 10, 1937.

A narrow strip of land comprising about 10 percent of the drainage area on its eastern edge is characterized by the Winnifred clay loam soil. The uppermost 2 to 4 inches of the soil consists of a grayish-brown silty clay loam. The layer immediately beneath has a heavier texture and a massive, weakly prismatic structure. Calcium carbonate, other carbonates, and sulphates are present at a depth of 8 inches and increase in concentration to a depth of about 3 feet. The material at this depth is yellowish gray. Areas of Winnifred soil are distinguished by low bare spots or "blow-out" holes.

The soils of the area as a whole are unproductive and normally support only a scant growth of various short grasses and the common black sage. The major part of the drainage basin has been classified as third- and fourth-grade grazing land, of which 28 to 55 acres is necessary to support a 1,000-pound steer.[2]

Erosion conditions: The entire catchment area is subject to intermittent sheet erosion which occurs during and following the infrequent but sometimes torrential rains. Rapid run-off is caused by the impervious nature of the soil and the absence of thick vegetation. The uppermost layer of soil rapidly reaches its capacity of absorption when rains occur, and inhibits infiltration into the subsoil. No conspicuous gullies have formed and are not likely to develop in the stiff impervious clays.

Land use: The drainage basin of Baker Reservoir has been used intermittently for grazing purposes, but has not been capable of supporting a large number of cattle, especially during the last 7 years which have been abnormally dry. A small area of about 100 acres near the west edge of the basin has been cultivated for wheat during the last 3 years, but it represents less than 0.3 percent of the watershed area. The operation of natural gas wells represents the principal activity at present.

Rainfall: According to records of the Montana State Planning Board the annual rainfall ranges from less than 10 inches to 24 inches, and averages 14.88 inches.

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[2]Planning an agricultural program for Fallon County. Montana Extension Service, Bozeman, Mont., October 1936.

<u>Draft on the reservoir</u>: No water is withdrawn from the reservoir at present. Records for the period 1920 to 1929, when the water was used for locomotive supply, show that an average of 16,000 gallons per day was pumped for that purpose. Consumption by the railroad was discontinued in 1929 because the dissolved sulphates and carbonates of the water were injurious to boilers.

Water is now used only in the form of ice, of which the annual production is about 300 tons.[3]

HISTORY OF THE SURVEY

The sedimentation survey of Baker Reservoir was made by a field party of the Section of Sedimentation Studies, Division of Research, between May 24 and June 6, 1937. The field personnel were as follows: Leland H. Barnes, chief of party, Mark P. Connaughton, Alvin T. Talley, Robert M. Dill, Richard K. Frevert, and Alfred J. Kjarsgaard. Reconnaissance data preliminary to the survey were secured by Elliott M. Flaxman. Studies of the lake sediment and an inspection of the drainage area were made by Victor H. Jones, assisted by the field party. F. L. Duley, regional representative of the Research Division, Lincoln, Neb., formulated cooperative agreements with state agencies and assisted in making arrangements for the survey.

The Soil Conservation Service acknowledges the assistance and cooperation of W. H. Penfield of Chicago, chief engineer, and H. G. Pitner of Miles City, Mont., assistant division engineer, of the Chicago, Milwaukee, St. Paul, and Pacific Railroad, in making arrangements for the survey and in furnishing data on the history and construction of the reservoir.

Facts concerning the soils and climate of the drainage basin were supplied by Gibson Zeidler of Baker, extension agent, Fallon and Carter Counties, and L. F. Gieseker, associate agronomist in charge of soil surveys, Montana Agricultural Experiment Station, Bozeman.

Acknowledgments are due to many residents of Baker who assisted the party during the survey. H. S. Proctor, chairman of the

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[3]Oral communication, A. L. Baker, operator of ice house, Baker, Mont.

local committee to investigate silt removal from the reservoir, supplied a boat, and A. L. Baker furnished figures on water use and ice consumption.

Original and remaining capacities and silt volumes were determined by the range method of survey.[4] Primary triangulation was begun by establishing a 1,100-foot base line along the east side of the lake. From this base line a system of 12 control points was located by plane-table triangulation. As no previous map of requisite accuracy was available, it was necessary to map the shore line of the reservoir. The crest-level contour, which has a total length of 4.35 miles, was mapped by plane table and telescopic alidade on a scale of 1 inch to 200 feet. Fourteen ranges for the measurement of silt thickness were established across the lake at suitable intervals. Locations of ranges and triangulation stations are shown on the accompanying shore-line map (fig. 4, following p. 15).

A topographic map of the reservoir basin, showing 1-foot contours on both original and existing surfaces, was prepared from the range data, and original and remaining capacity curves were plotted (fig. 7). All important survey points were permanently marked in the field with monuments, each consisting of a $\frac{1}{2}$- by 4-inch carriage bolt and washer stamped with the station number and set in a concrete base 0.6 foot in diameter and 2 feet deep.

As no accurate map of the drainage basin was available, its boundary was mapped during the course of the survey in order to obtain an accurate measurement of the watershed area. The distinct divides and absence of trees permitted rapid and accurate mapping of the boundary by plane-table traverse.

Five samples of bottom sediment were taken from various parts of the lake with the $1\frac{1}{2}$-inch tubular sampler previously described.[5] The samples were taken in iron pipe nipples, $1\frac{1}{2}$ inches in diameter and 4 inches long, which were screwed to the bottom of the sampling apparatus and removed after the samples were obtained. The 4-inch nipples containing the samples were capped with threaded airtight iron covers for shipment to the laboratory. The volume-weight

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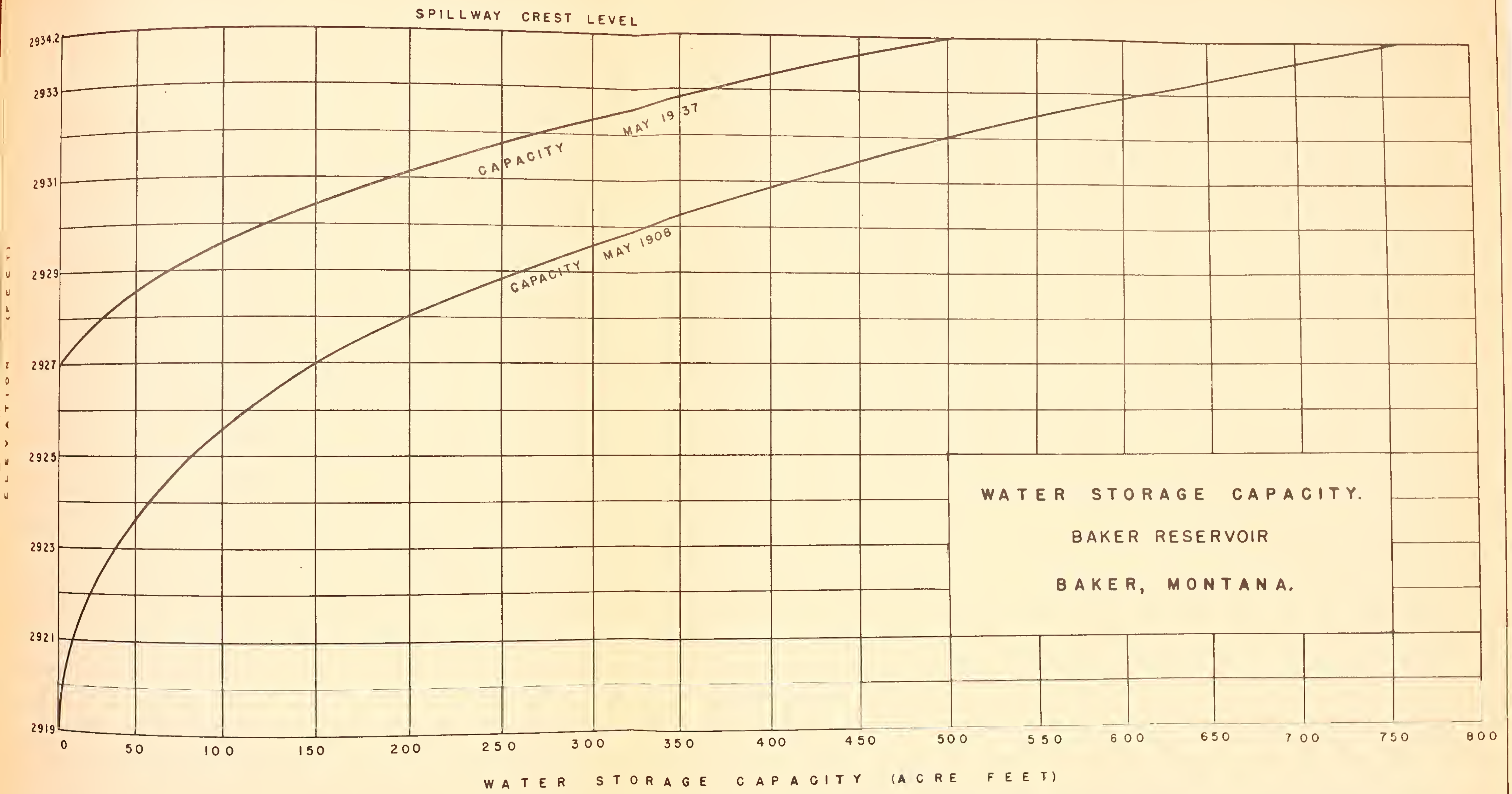
[4] Eakin, H. M., Silting of reservoirs. U. S. Dept. Agr. Tech. Bull. 524: 129-135, July 1936.

[5] Jones, Victor H., Advance report on the sedimentation survey of Lake Bracken, Galesburg, Ill. U. S. Dept. Agr. Soil Conserv. Serv. SS-14: 7, 1937. (Mimeographed).

Figure 7


SPILLWAY CREST LEVEL
2934.2
2933
2931
2929
2927
2925
2923
2921
2919
ELEVATION (FEET)
CAPACITY MAY 1937
CAPACITY MAY 1908
WATER STORAGE CAPACITY.
BAKER RESERVOIR
BAKER, MONTANA.
0
50
100
150
200
250
300
350
400
450
500
550
600
650
700
750
800
WATER STORAGE CAPACITY (ACRE FEET)
Revised 6-11-38
O- 2220

relations of the samples were determined by the hydraulic laboratory unit of the Section of Soil and Water Conservation Experiment Stations, Division of Research, at Washington, D. C.

SEDIMENT DEPOSITS

Character of Sediment

Field examination of the lake sediment at many places showed a limited range of texture. The sediment over the major portion of the lake bottom is smooth between the fingers, adheres moderately to the spud, and consists chiefly of silt and clay. It ranges in color from grayish brown to nearly black, but dark grayish brown is the prevailing shade. Near the dam and at several other places where water and silt are deep, streaks of black carbonaceous material, representing concentrations of vegetal matter, occur at several levels within the deposit.

The upper few inches of the sediment is very soft over most of the reservoir bottom so that unusual care was required in manipulation of the sounding weight. One foot below its surface the sediment, especially near the dam, is much more compact. The sediment in the upper portion of the lake basin, above range R16-R17, has been exposed to the atmosphere on numerous occasions during periods of low water, so that it has been partly dried, somewhat compacted, and has developed reddish oxidation bands. Above range R16-R17 it contains a small percentage of fine sand grains. During the survey most of the area of the basin above range R18-R19 was dry, and the upper surface of the deposit was covered with an intricate pattern of desiccation cracks which divided the surface into polygonal blocks about 5 inches in diameter and 0.2 inch thick.

Characteristic shore zones have been developed around the greater part of the lake margin, but are more conspicuous below range R14-R15 where wave action is more vigorous. The clays and clay-shales which are eroded by waves along the shore break up into pellets a quarter of an inch and less in diameter which are concentrated in wave-built terraces about 3 feet deep and extending about 50 feet from crest-level shore line into the reservoir basin. Only very slight notching along the shores has accompanied this process. Small quantities of angular chert and limestone gravel also occur in the shore deposit. This coarse sediment originates from the disintegration of calcareous concretions which occur in the country rock. Minor quantities of red angular clinker gravel were also observed in the near-shore deposits.

The bottom of the lake deposits nearly everywhere is defined by a distinct transition zone. A sandy zone ranging from paper-thinness to a half-inch in thickness occurs immediately beneath the lake silts. The sand lies upon the old turf below which occurs a soil profile similar to that on the slopes around the lake. This soil is tough, plastic, and impervious, and can readily be distinguished from the overlying lake deposits on the basis of relative compaction alone.

Five samples of bottom sediment were taken from various parts of the lake. The location, depth relations, and dry weights of these samples are shown in table 1.

Table 1.--Samples of bottom sediment from Baker Reservoir

Location	Sample number	Water depth	Silt thickness	Penetration	Wt. per cubic foot
		Feet	Feet	Feet	Pounds
Range R14-R15, 374 feet from R14..............	48	3.0	1.8	0.8	66.0
Range R11-R12, 417 feet from R12.............	49	4.0	1.9	0.8	68.0
Range R5-R6, 438 feet from R6..............	50	5.0	5.2	3.0	28.8
Range R1-R3, 277 feet from R1..............	51	5.1	7.4	1.0	20.1
Range R1-R3, 710 feet from R1..............	52	5.0	4.3	1.0	20.1

In table 1 the figures under "Penetration" represent the depth below the top of the sediment to which the bottom end of the sampler penetrated the material at the time the sample was taken. The figures in the last column apply to the dried sediment, and indicate that considerable compaction has occurred in the lake deposits that are less than 6 feet below crest. Samples 48 and 49 have an average weight of 67 pounds per cubic foot and are typical of the more recent layers of the lake deposit. Samples 50 to 52 have an average weight of 23 pounds per cubic foot. The marked difference is due to desiccation and compaction resulting from exposure to the atmosphere during periods of low water. The lake level is commonly 2 to 5 feet below crest, but rarely as low as 6 feet.

Distribution of Sediment

The thickest accumulation of lake sediment was measured in the deepest water near the dam (fig. 8). Measurements on range R1-R2 showed that the common thickness of sediment across the major part of the range was 5 to 9 feet, beneath water 5 to 6 feet deep at crest stage. The upper surface of the sediment is practically level. The thickness of the bottom sediment decreases almost uniformly upstream from the dam. On range R12-R13, which is approximately midway between the dam and the head of the lake, the maximum thickness is 2.9 feet, beneath 5.5 feet of water. The upper surface of the deposit here also tends toward flatness, but a smaller proportion of the original cross-section area of the lake is occupied by sediment. On range R22-R21 the maximum thickness is 0.8 feet, beneath a water depth of 1 foot. No delta has been formed and no appreciable quantities of sediment have been deposited above crest level either at the head of the reservoir or along the lower shores.

Wave action has been sufficiently vigorous to form depositional terraces which average about 0.6 foot thick and 50 feet wide around the greater part of the shore line just below crest level.

Sediment which accumulated just above crest level is subject to attack by wave action and is subsequently carried into the reservoir. Inflowing currents at the head of the lake during and immediately following rains are sufficient to sweep most of the sediment into lower areas of the lake bottom. Furthermore, the level of lake water rarely rises above crest level so that relatively little sediment is carried over the spillway. All these factors contribute to the concentration of sediment in the lower portion of the lake basin.

Origin of Sediment

Nearly all the lake sediment is derived from sheet erosion during the infrequent rainstorms over the catchment area. The material thus eroded is carried down the major stream courses, and a large proportion of it is carried rather quickly into the reservoir, because nearly all of the sediment is of silt or clay size. Erosion by gullies is not an important factor, largely because of the prevalence of impervious tough clay-shales in the area. Deposition of silt and clay particles in the reservoir by the wind occurs more or less frequently, but the proportion of sediment contributed directly by this means is relatively small. On the other hand, the effect of the wind in causing accumulation of loose soil material that is highly susceptible to further transportation by water should not be minimized.

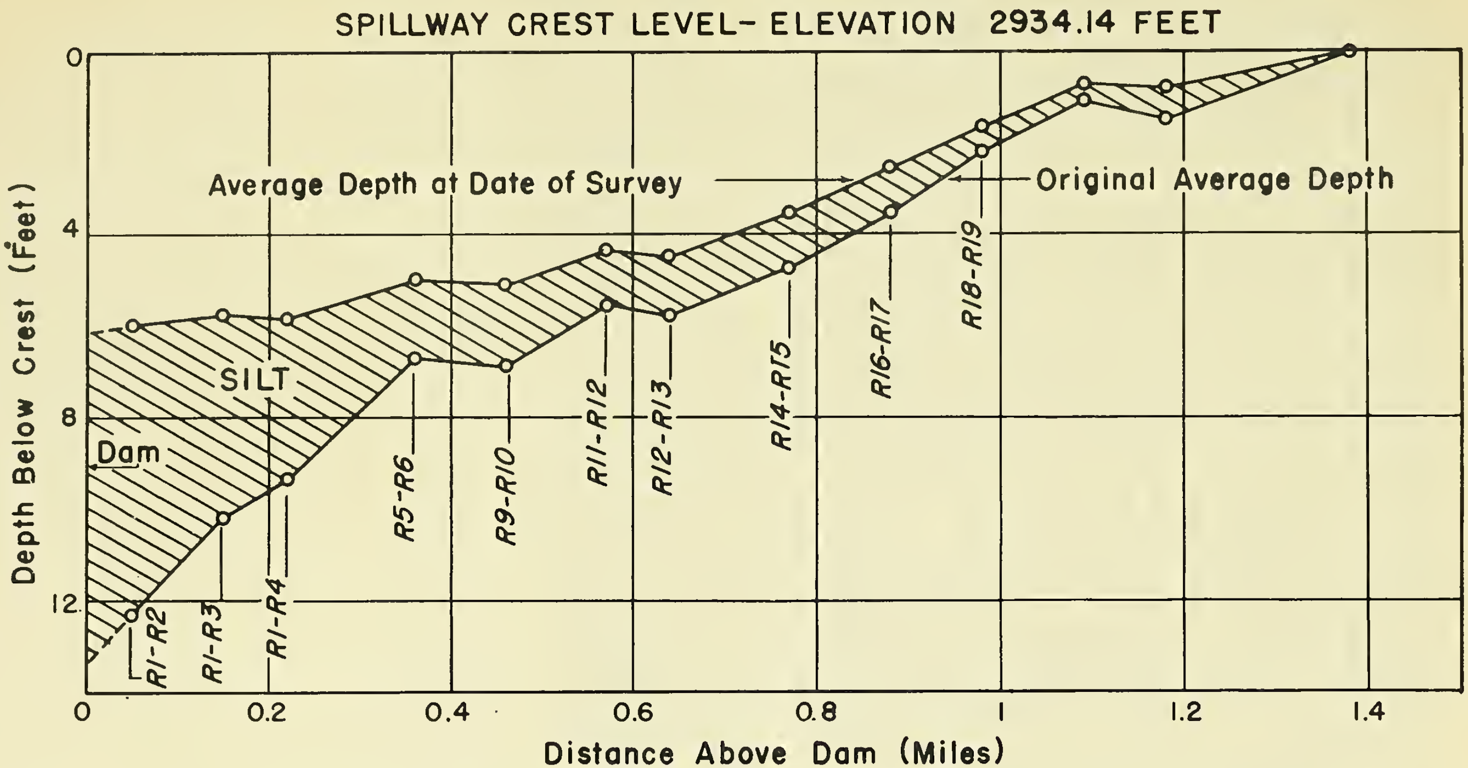


FIGURE 8. AVERAGE-DEPTH PROFILES, BAKER RESERVOIR
Baker, Montana

N-2191
Revised 6-11-38

POSSIBILITIES FOR REMOVING SEDIMENT

Prior to the survey of Baker Reservoir it was known that much sediment had accumulated in the basin. Since 1929 the city of Baker has been using the reservoir for ice supply and recreational purposes by special agreement with the railroad. Early in 1937 the development of local interest in the silting problem resulted in the appointment of three Baker residents, H. S. Proctor, William Krukenburg, and Ora Blanchard, as a committee to investigate possible methods of removing silt from the lake. Their action revealed several factors favorable to the development of a silt-removal project. Request has been made to the Milwaukee Railroad for the loan of a hydraulic dredge of suitable size with an agitator in front of the intake to mix the sediment with sufficient water to allow removal by hydraulic means. Natural gas from near-by municipal wells could be used for fuel at a very low cost; furthermore, the large municipal water wells could be used to supplement the lake water in dredging. Officials of Baker have estimated that the wells would furnish enough water, above the needs of the city, to supply the dredge continuously. It has been proposed that the sediment removed by dredging be dumped into the basin-like area of the valley just below the dam.

As a result of the sedimentation survey, several factors bearing upon the silt-removal problem may be evaluated. A study of the nature and volumes of sediment in the lower part of the reservoir (below range R12-R13) showed that a large proportion of the sediment in that part of the basin could probably be removed by hydraulic means. Total and estimated removable silt volumes are summarized in table 2.

Table 2.--Probable volumes of silt that could be removed from Baker Reservoir by hydraulic means

Segment	Total silt volume	Proportion removable	Removable volume
	Acre-feet	Percent	Acre-feet
1	31.2	90	28.2
2	49.3	90	49.4
3	38.8	85	33.0
4	55.2	80	44.2
7	21.3	75	16.0
8	15.3	60	9.2
9	6.4	50	3.2
Total removable silt			183.2

The removable sediment has an estimated volume of 183.2 acre-feet, which is 72 percent of the total reservoir deposit, and it occurs in the deeper portion of the basin near the dam. Compacted material within about 200 feet of shore probably could not be removed economically by a hydraulic dredge. Similarly, the sediment near the head of the lake, including all the material above range R12-R13, probably could be removed only by mechanical means.

The area under consideration for silt disposal just below the dam has a capacity of 87.4 acre-feet, which is 48 percent of the estimated total volume of removable silt. Compaction of the sediment by drying after deposition by the dredge would increase this percentage somewhat.

SUMMARY

The detailed sedimentation survey of Baker Reservoir reveals an average annual sediment accumulation of 8.7 acre-feet, or about 119 cubic feet per acre of drainage area. Assuming that 2 cubic feet of sediment in the reservoir are equivalent to 1 cubic foot of soil in the drainage basin, the above rate of sedimentation indicates that the time required to remove 1 inch of soil from the entire basin is about 61 years.

Examination of the drainage basin indicated that erosion, and consequently sedimentation, has been accelerated to a considerable extent by overgrazing and by attempted cultivation of land during drought years.

The results of the detailed sedimentation survey of Baker Reservoir are summarized in the following tabulation.

Summary of data on Baker Reservoir, Baker, Mont.

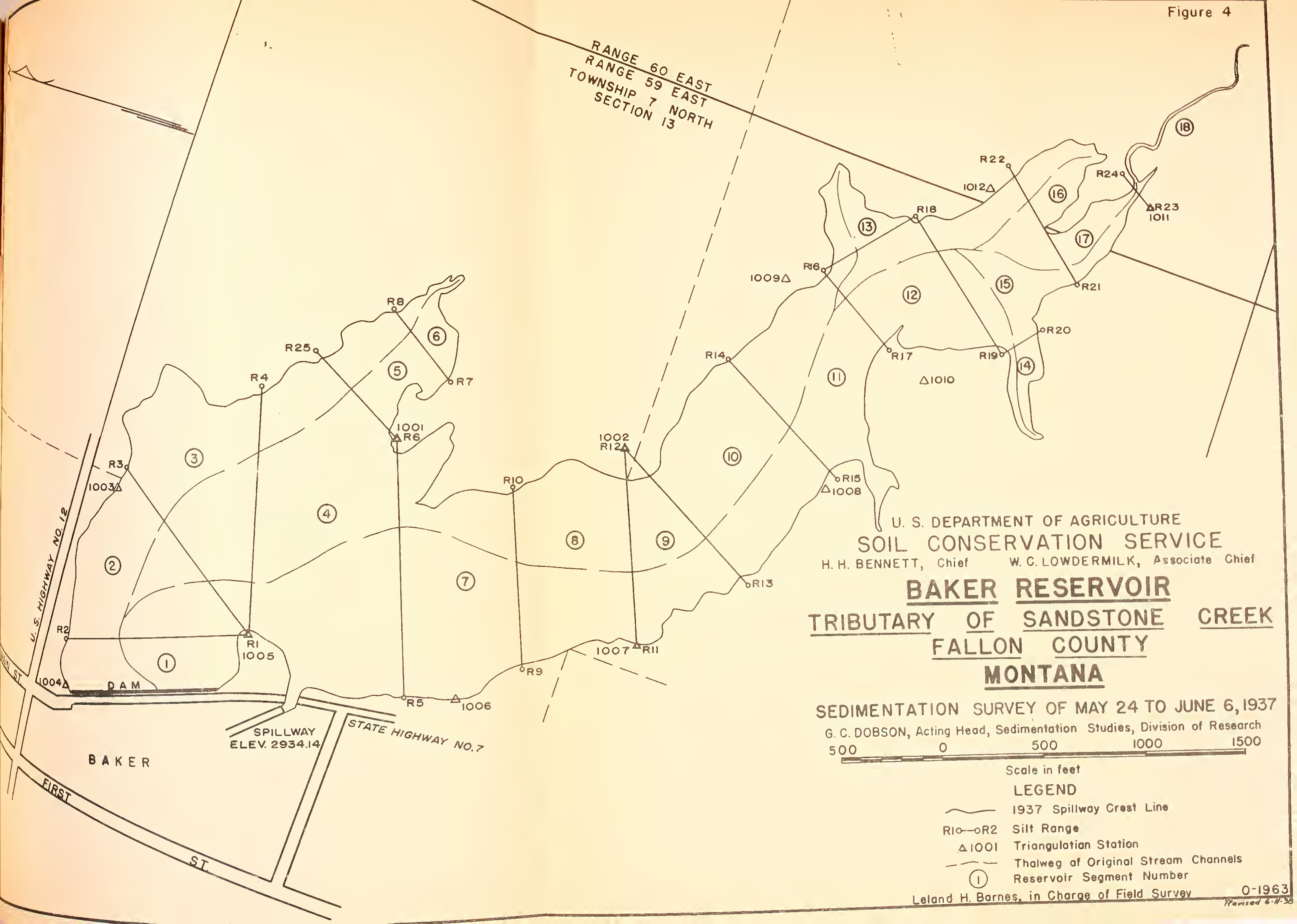
	Quantity	Unit
Age[1]	29.1	Years
Watershed area[2]	5.2	Sq. miles
Reservoir:		
Area at crest stage:		
Original	122	Acres
At date of survey	122	Acres
Storage capacity to crest level:		
Original	756	Acre-feet
At date of survey	502	Acre-feet
Capacity per sq. mi. of drainage area:[2]		
Original	145.38	Acre-feet
At date of survey	96.54	Acre-feet
Sedimentation:		
Total sediment	254	Acre-feet
Average annual accumulation:		
From entire drainage area	8.7	Acre-feet
Per 100 sq. mi. of drainage area[3]	174.2	Acre-feet
Per acre of drainage area:[3]		
By volume	118.58	Cubic feet
By weight (assuming 1 cubic foot of silt weighs 39 pounds, as determined from 5 samples)	2.31	Tons
Depletion of storage:		
Loss of original capacity:		
Per year	1.15	Percent
To date of survey	33.60	Percent

[1]Storage began May 1908; average date of survey, June 1937.

[2]Including area of lake.

[3]Excluding area of lake.

Figure 4


RANGE 60 EAST
RANGE 59 EAST
TOWNSHIP 7 NORTH
SECTION 13
U. S. HIGHWAY NO. 12
DAM
SPILLWAY
ELEV. 2934.14
STATE HIGHWAY NO. 7
BAKER
FIRST
ST.
R1
1005
R2
R3
1003
R4
R5
1006
R6
1001
R7
R8
R9
R10
R11
1007
R12
1002
R13
R14
R15
1008
R16
1009
R17
1010
R18
R19
R20
R21
R22
1012
R23
1011
R24
R25
1004
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
H. H. BENNETT, Chief W. C. LOWDERMILK, Associate Chief
BAKER RESERVOIR
TRIBUTARY OF SANDSTONE CREEK
FALLON COUNTY
MONTANA
SEDIMENTATION SURVEY OF MAY 24 TO JUNE 6, 1937
G. C. DOBSON, Acting Head, Sedimentation Studies, Division of Research
500 0 500 1000 1500
Scale in feet
LEGEND
1937 Spillway Crest Line
R1—R2 Silt Range
△1001 Triangulation Station
Thalweg of Original Stream Channels
① Reservoir Segment Number
Leland H. Barnes, in Charge of Field Survey
0-1963